Mathematics I (E610004)

Course size *(nominal values; actual values may depend on programme)*

Credits 6.0 **Study time** 180 h

Course offerings and teaching methods in academic year 2023-2024

| A (semester 1) | Dutch | Kortrijk | lecture |
| | | | seminar |

Lecturers in academic year 2023-2024

| De Vos, Oriana | TW05 | staff member |
| Laermans, Eric | TW05 | lecturer-in-charge |

Offered in the following programmes in 2023-2024	crdts	offering
Bachelor of Science in Engineering Technology(main subject Machine and Production Automation)	6	A
Bachelor of Science in Industrial Design Engineering Technology	6	A
Bachelor of Science in Engineering Technology (Joint Section)	6	A
Linking Course Master of Science in Industrial Design Engineering Technology	6	A
Linking Course Master of Science in Machine and Production Automation Engineering Technology	6	A

Teaching languages

Dutch

Keywords

Complex numbers, vectors, analytical geometry, real functions of one variable, continuity, limit, differential calculus, integral, parametric curves, polar curves

Position of the course

The aim of the course is to provide insight into the theory and practice of essential mathematical concepts and methods related to complex numbers, real vectors, 3-dimensional analytic geometry, continuity, limits, differential calculus and integrals of one variable functions, parametric and polar curves. The treated subjects are primarily chosen in relation with the study programme.

Contents

- Complex numbers: different representations, calculation rules, Euler' formula, n-th roots, polynomial solving, applications.
- Vectors: representation, calculation rules, scalar product, vector product, scalar triple product, properties and applications.
- Classification of quadratic curves.
- 3-dimensional analytic geometry: classification of quadratic surfaces, spherical and cylindrical coordinates.
- One variable real functions: definitions and properties.
- Continuity, limits: definitions, theorems and applications. First and higher order derivative and differential: definitions, calculation rules, theorems and applications.
- Integration techniques, definite integrals and their applications.
- Polar curves, parametric representation of planar curves.

Initial competences

Mathematical knowledge from secondary school, as treated during the summer course mathematics.

Final competences

1 To have acquired insight in the mathematical, geometric and physical interpretation of the

notions continuity, derivative, differential, integral
2 To have acquired insight in the different representations of planar curves
3 To have acquired insight in the mathematical, geometric and physical interpretation of notions from 2D geometry and 3D geometry.
4 Being able to make computations with complex numbers
5 To have acquired insight in the mathematical, geometric and physical interpretation of vectors and being able to apply them on engineering problems
6

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture

Extra information on the teaching methods

During the colleges, the different topics are taught and some representative exercises are developed. During the practicum, extra exercises are made and/or explained.

Learning materials and price

Lecture notes in Dutch.
Slides available on Ufora.

References

- Calculus, B. Thomas, Pearson
- Wiskunde voor het hoger technisch onderwijs, Lothar Papula, Academic Service
- Advanced Calculus, Murray R. Spiegel, Schaum' Outline Series

Course content-related study coaching

Tutorial service
The lecturer can be asked questions by appointment.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment

Examination methods in case of permanent assessment

Written assessment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

* intermediate evaluation around the end of october --> TE (/20)
Participation is mandatory, otherwise 0/20 is given for TE

* evaluation in january --> EZ1 (/20)
ALL chapters regardless of the score of the intermediate evaluation

* evaluation in august --> EZ2
ALL chapters

The precise organisation of the evaluation moments will be communicated via Ufora as soon as there is sufficient clarity about what is possible in view of the sanitary situation.

Calculation of the examination mark

Period 1, January :
If the student participated in the intermediate evaluation:
   Total = Maximum(1/4 $\times$ TE + 3/4 $\times$ EZ1, 1/10 x TE + 9/10 x EZ1)

If the student was unjustifiably absent at the intermediate evaluation:

Total = 1/4 x TE + 3/4 x EZ1

Period 2, August :

Total = Maximum(EZ2 ; 1/4 x TE + 3/4 x EZ2)

When EZ is less than or equal to 7/20, the final score will be at most 9/20.